PROCEEDINGS OF THE BIOLOGICAL SOCIETY OF WASHINGTON
112(1):70–93. 1999.

Anacroneuria from northeastern South America (Insecta: Plecoptera: Perlidae)

Bill P. Stark

Department of Biology, Mississippi College, Clinton, Mississippi 39058, U.S.A.

Abstract.—Descriptions are given for ten new species of *Anacroneuria* from Venezuela, Guyana, and Suriname, and records are given for ten species previously described from this region. The following 10 new species are described (type locality in parenthesis): *Anacroneuria achagua* (Venezuela. Portuguesa: Guanare), *A. arawak* (Suriname. Brokopondo: Brownsberg Naturpark, Mazaroni Plateau), *A. chaima* (Venezuela. Sucre: Rio Cocollar, 1.5 km SE Las Piedras de Cocollar), *A. claudiae* (Venezuela. Zulia: Rio Yasa (3 km E Kasmera), Estacion Biologica), *A. karina* (Venezuela. Sucre: Rio Cocollar, 1.5 km SE Las Piedras de Cocollar), *A. makushi* (Guyana. Kanuku Mountains, Moco Moco River), *A. paria* (Venezuela. Sucre: Rio Cocollar, 1.5 km SE Las Piedras de Cocollar), *A. perija* (Venezuela. Zulia: Parque Nacional Perija, Rio Negro, Toromo), *A. timote* (Venezuela. Tachira: Quebrada Los Mirtos, 8 km S El Cobre), and *A. wapishana* (Guyana. Potaro River, Kaieteur Falls). *Anacroneuria phantoma* (Banks) and *A. pictipes* Klapálek are redescribed and a modified key to regional males is presented.

Stark (1995) provided descriptions of Venezuelan *Anacroneuria* based on collections made primarily through 1985. Recently a series of Venezuelan and Guyanan specimens collected in 1994–97 were made available by O. S. Flint and R. Holzenthal, and a few specimens were provided by the California Academy of Science. This material includes nine new species, new records for eight previously described species, and a few unassociated females described under informal designations. Also included are redescriptions of *A. pictipes* Klapálek and *A. phantoma* (Banks) from holotypes and an additional new species from Suriname. Holotypes are deposited in the National Museum of Natural History, Washington, D.C. (USNM) or the California Academy of Science, San Francisco, CA (CAS). Paratypes and other specimens are deposited in the Universidad Central de Venezuela, Maracuy (UCV), the University of Minnesota, Saint Paul (UMSP) or the collection of the author (BPS). Additional material was examined from the Museum of Comparative Zoology, Harvard University (MCZ) and the National Museum of Natural History, Prague (NMH).

Anacroneuria achagua, new species

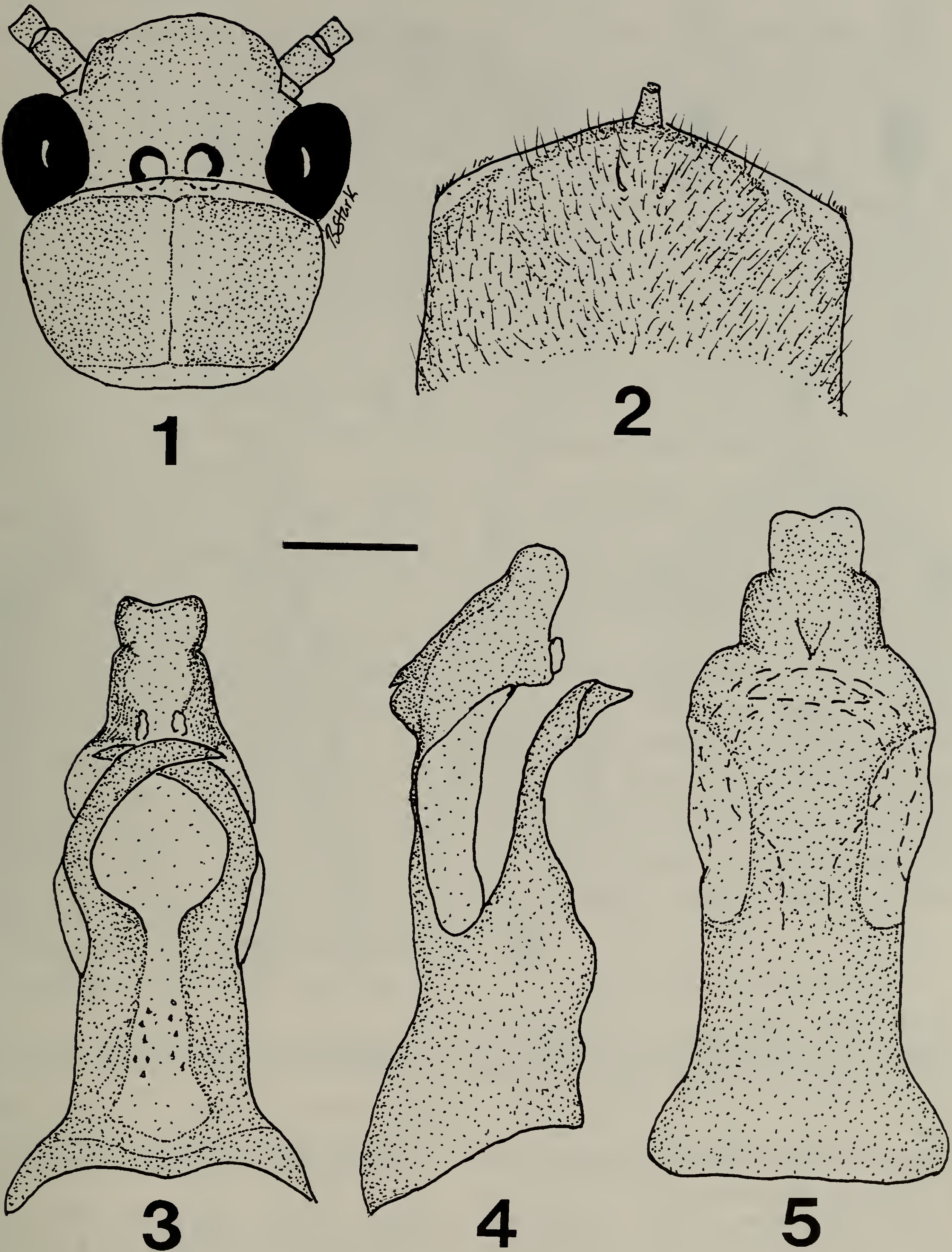
Adult habitus.—Head with an obscure brown pattern over anterior half of frons; lappets brown. Median pronotal stripe pale, broad irregular lateral bands brown (Fig. 1). Wing membrane transparent, veins pale.

Male.—Forewing length 8 mm Hammer thimble shaped, height greater than basal diameter (Fig. 2). Aedeagal apex short, with wide, emarginate tip offset from shoulders; ventral aspect with an obscure pair of membranous lobes; dorsal keel triangular; shoulders somewhat quadrate, hooks stout (Figs. 3–5).

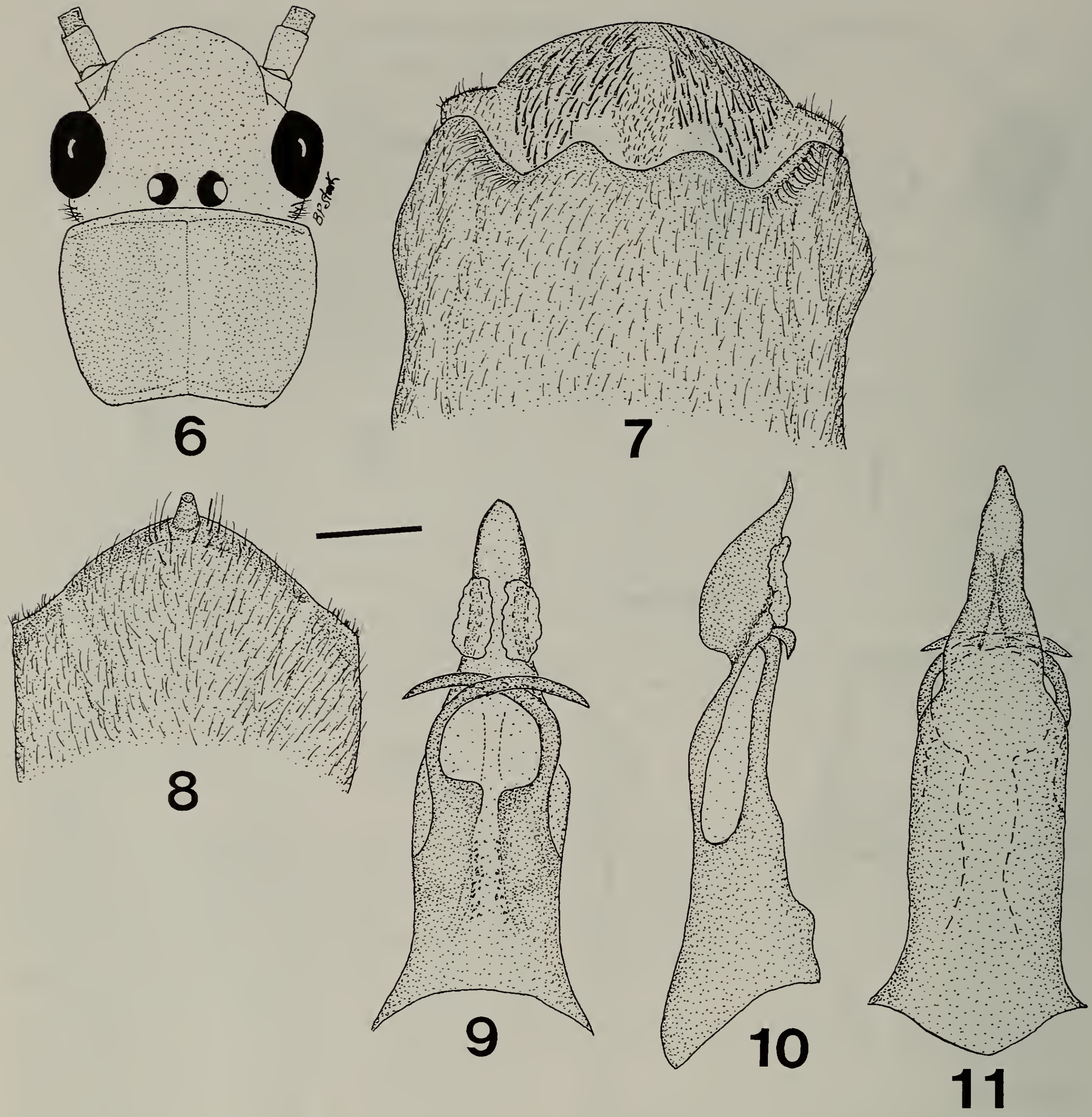
Female.—Unknown.

Nymph.—Unknown.

Etymology.—The name honors the



Figs. 1–5. *A. achagua* structures. 1. Head and pronotum. 2. Male sternum 9. 3. Aedeagus, ventral. 4. Aedeagus, lateral. 5. Aedeagus, dorsal. Scales: 0.6 mm (1), 0.3 mm (2), 0.15 mm (3–5).



Figs. 6–11. *A. arawak* structures. 6. Head and pronotum. 7. Female sterna 8 and 9. 8. Male sternum 9. 9. Aedeagus, ventral. 10. Aedeagus, lateral. 11. Aedeagus, dorsal. Scales: 0.6 mm (6), 0.3 mm (7, 8), 0.15 mm (9–11).

Achagua people of Venezuela and is used as a noun in apposition.

Types.—Holotype ♂ and ♂ paratype from Venezuela, Portuguesa, Guanare, 10–13 Sep 1957, B. Malkin (CAS).

Diagnosis.—This species has a V-shaped aedeagal keel and apex somewhat like that of *A. pictipes* but these species are easily distinguished by the distinctive wing and pronotal pigmentation of that species (Figs. 48, 53).

Anacroneuria arawak, new species

Adult habitus.—Head with diffuse yellow brown area extending forward from ocelli; pronotum with diffuse brown lateral bands and a narrow pale median band (Fig. 6). Wing membrane transparent, veins pale.

Male.—Forewing length 9 mm. Hammer thimble shaped, height subequal to basal diameter (Fig. 8). Aedeagal apex slender, scoop shaped with a pair of subapical ventral membranous lobes. Apex curved slightly dorsad; hooks slender, dorsal keel long and narrow (Figs. 9–11).

Female.—Forewing length 10.5 mm. Subgenital plate four lobed, median lobes shorter than lateral lobes; inner margins of lateral lobes bearing a short setal fringe. Sternum 9 with a broad transverse sclerite and a trilobed median setal patch; median lobe clothed with minute setae, lateral lobes with prominent setae (Fig. 7).

Nymph.—Unknown.

Etymology.—The name honors the Arawak people of Guyana and Suriname and is used as a noun in apposition.

Types.—Holotype ♂ and ♀ paratype from Suriname, Brokopondo District, Brownsberg Naturpark, Mazaroni Plateau, 400–500 m, 16 Aug 1982, W. E. Steiner (USNM).

Diagnosis.—This species does not appear to be closely related to other regional *Anacroneuria.* The aedeagal shape and pale habitus are somewhat similar to *A. isleta* (Stark 1994) but that species has a triangular keel and a shorter and more rounded aedeagal tip. In dorsal aspect the aedeagus is similar to that of *A. bari* (Stark 1995), but that species does not have membranous ventral lobes on the aedeagus. The female is distinctive by virtue of the setal fringe on the lateral subgenital plate lobes (Fig. 7).

Anacroneuria aroucana Kimmins

Anacroneuria aroucana Kimmins, 1948: 105. Holotype ♂, Arouca River, Trinidad.
Anacroneuria aroucana: Stark, 1994:173.

Material.—Venezuela: Sucre, Quebrada Zapateral, 1.5 km SE Las Piedras de Cocollar, 810 m, 9 Apr 1995, R. Holzenthal, O. S. Flint, 4 ♂ (USNM, UCV). Sucre, Rio Cocollar, 1.5 km SE Las Piedras de Cocollar; 810 m, 7–8 Apr 1995, R. Holzenthal, O. S. Flint, 10 ♂ (USNM).

Comments.—These are the first mainland records for this species.

Anacroneuria bari Stark

Anacroneuria bari Stark, 1995:226. Holotype ♂, El Tucuco, 45 km SW Machiques, Zulia, Venezuela.

Material.—Venezuela: Guarico, Parque Nacional Guatopo, Quebrada Guatopo, 0.5 km NE La Colina, 600 m, 22 Jan 1994, R. Holzenthal, C. Cressa, Rincón, 3 ♂ (UMSP, UCV). Trujillo, Quebrada Potrerito, 7.5 km NE Bocono, 1530 m, 29–30 Apr 1995, R. Holzenthal, C. Cressa, Gutic, 2 ♂ (BPS).

Comments.—This species was previously reported from the Venezuelan states of Barinas, Miranda, and Zulia (Stark 1995).

Anacroneuria bifasciata (Pictet)

Perla bifasciata Pictet, 1841:231. Holotype ♀, Moritz, Colombia.
Anacroneuria bifasciata: Zwick, 1972: 1154.
Anacroneuria bifasciata: Stark, 1995:239.

Material.—Venezuela: Distrito Federal, Rio Camuri Grande, 1 km S Camuri (nucleo USB), 30 m, 24 Jan 1994, R. Holzenthal, C. Cressa, Rincón, 1 ♂, 1 ♀ (BPS).

Comments.—This species was previously reported from the Venezuelan states of Aragua, Distrito Federal, and Lara (Stark 1995).

Anacroneuria caraca Stark

Anacroneuria caraca Stark, 1995:228. Holotype ♂, Rio Limon, Parque Nacional Henri Pittier, Aragua, Venezuela.

Material.—Venezuela: Guárico, Parque Nacional Guatopo, Quebrada Guatopo, 0.5 km NE La Colina, 600 m, 22 Jan 1994, R. Holzenthal, C. Cressa, Rincón, 1 ♂ (UMSP).

Comments.—This species was previously reported from the Venezuelan states of Aragua and Barinas (Stark 1995).

Anacroneuria chaima, new species

Adult habitus.—Head with a wide brown area forward of ocelli extending to M-line;

lappets and anterior margin of head brown. Median pronotal stripe pale; broad lateral stripes dark brown (Fig. 12). Wing membrane and veins brown.

Male.—Forewing length 8 mm. Hammer cylindrical, height greater than basal diameter (Fig. 13). Aedeagal apex simple, scoop shaped, slender and rounded at the tip; ventral aspect with a small circular pair of membranous lobes; dorsal aspect with a low wide keel; hooks slender (Figs. 14–16).

Female.—Unknown.

Nymph.—Unknown.

Etymology.—The name honors the Chaima people of Venezuela and is used as a noun in apposition.

Types.—Holotype ♂ (pinned) from Venezuela, Sucre, Rio Cocollar, 1.5 km SE Las Piedras de Cocollar, 810 m, 7–8 Apr 1995, R. Holzenthal, O. S. Flint (USNM).

Diagnosis.—This species is similar to *A. perija* in general aedeagal structure but differs in having small, circular membranous aedeagal lobes (Fig. 14) and in having the arms of the dorsal aedeagal keel divergent (Fig. 16). The dark color pattern of *A. perija* is also much more prominent, particularly over the occiput (Fig. 38).

Anacroneuria chorrera Stark

Anacroneuria chorrera Stark, 1995:230. Holotype ♂, La Chorrera Canyon, Merida, Venezuela.

Material.—Venezuela: Merida, Rio La Gonzalez, between Merida and Jaji, 1870 m, 25 Apr 1995, R. Holzenthal, C. Cressa, Gutic, 3 ♂ (UCV). Merida, Rio Albarregas, 1 km NW Universidad de los Andes, 1980 m, 17 Jan 1994, R. Holzenthal, C. Cressa, Rincón, 3 ♂ (UMSP). Merida, Parque Nacional Sierra Nevada, Quebrada La Mucuy, 7 km E Tabay, 2200 m, 18 Jan 1994, R. Holzenthal, C. Cressa, Rincón, 4 ♂ (BPS). Trujillo, Quebrada Potrerito, 7.5 km NE Boconó, 1530 m, 20–30 Apr 1995, R. Holzenthal, C. Cressa, Gutic, 4 ♂ (UMSP). Tachira, tributary to El Valle, 3.8 km SE El Zumbador, 2730 m, 21 Apr 1995, R. Holzenthal, C. Cressa, Gutic, 7 ♂ (UMSP). Tachira, Quebrada Los Mirtos, 8 km S El Cobre, 2400 m, 22 Apr 1995, R. Holzenthal, C. Cressa, Gutic, 1 ♂ (UCV).

Comments.—This species was previously reported from the Venezuelan states of Aragua, Distrito Federal, and Merida (Stark 1995).

Anacroneuria claudiae, new species

Adult habitus.—Head yellow with diffuse brown pattern extending from ocelli to anterior margin but interrupted by three pale areas at M-line; lappets brown. Median pronotal stripe pale, lateral stripes dark, anterolateral margins with pale spot (Fig. 17). Wing membrane transparent, veins brown.

Male.—Forewing length 8 mm. Hammer thimble shaped, height greater than basal diameter (Fig. 18). Aedeagal apex simple, scoop shaped, slender and truncate at the tip; ventral aspect with a small pair of membranous lobes; dorsal aspect with a narrow keel, hooks slender (Figs. 19–21).

Female.—Unknown.

Nymph.—Unknown.

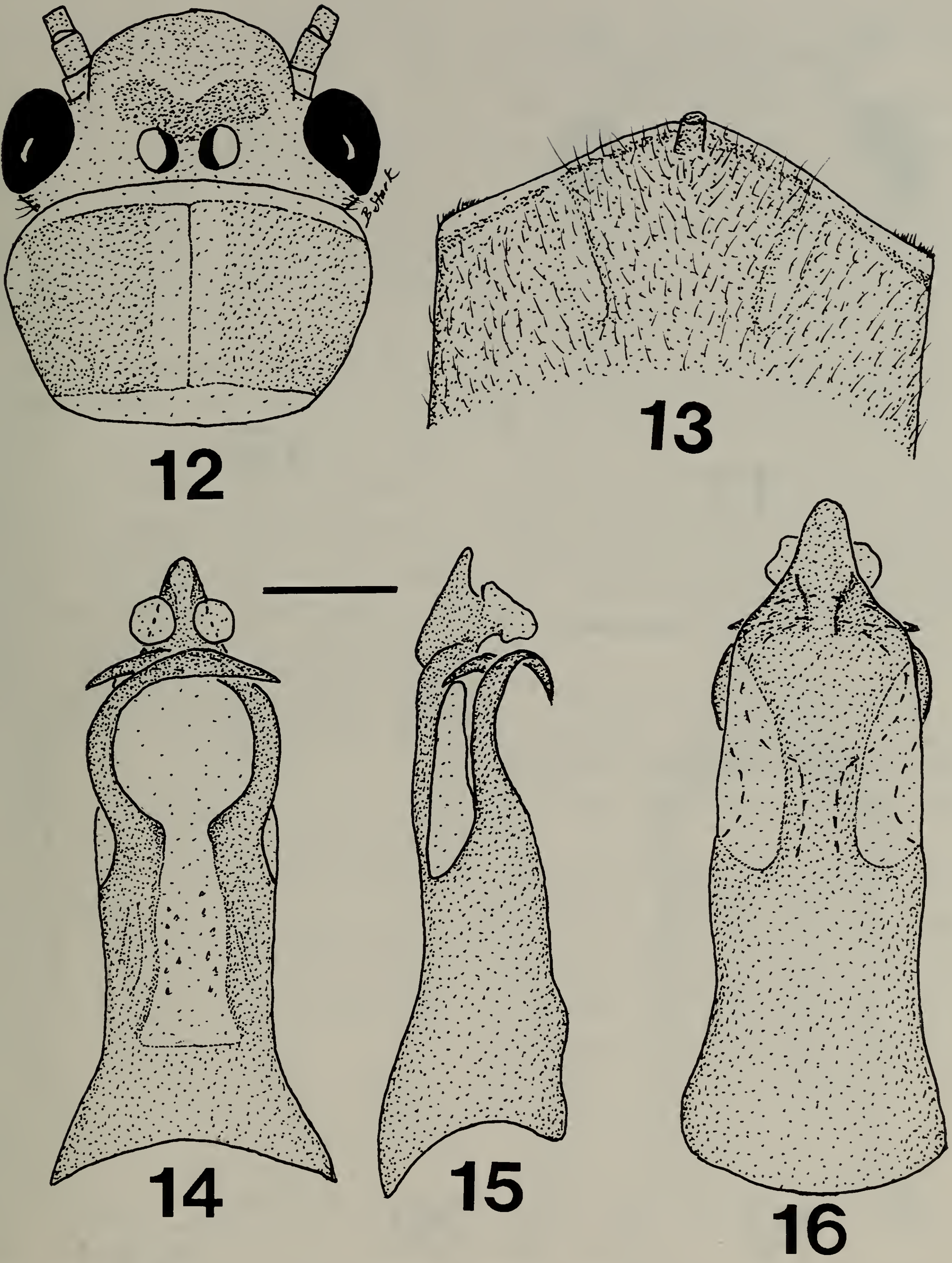
Etymology.—The matronym honors Claudia Cressa of the Universidad Central de Venezuela, Caracas.

Types.—Holotype ♂ from Venezuela, Zulia, Rio Yasa, 3 km E Kasmera (Estacion Biologica), 150 m, 14 Jan 1994, R. Holzenthal, C. Cressa, Rincón (USNM). Paratype ♂ from Venezuela, Zulia, Parque Nacional Perija, Rio Negro, Toromo, 360 m, 15 Jan 1994, R. Holzenthal, C. Cressa, Rincón (UCV).

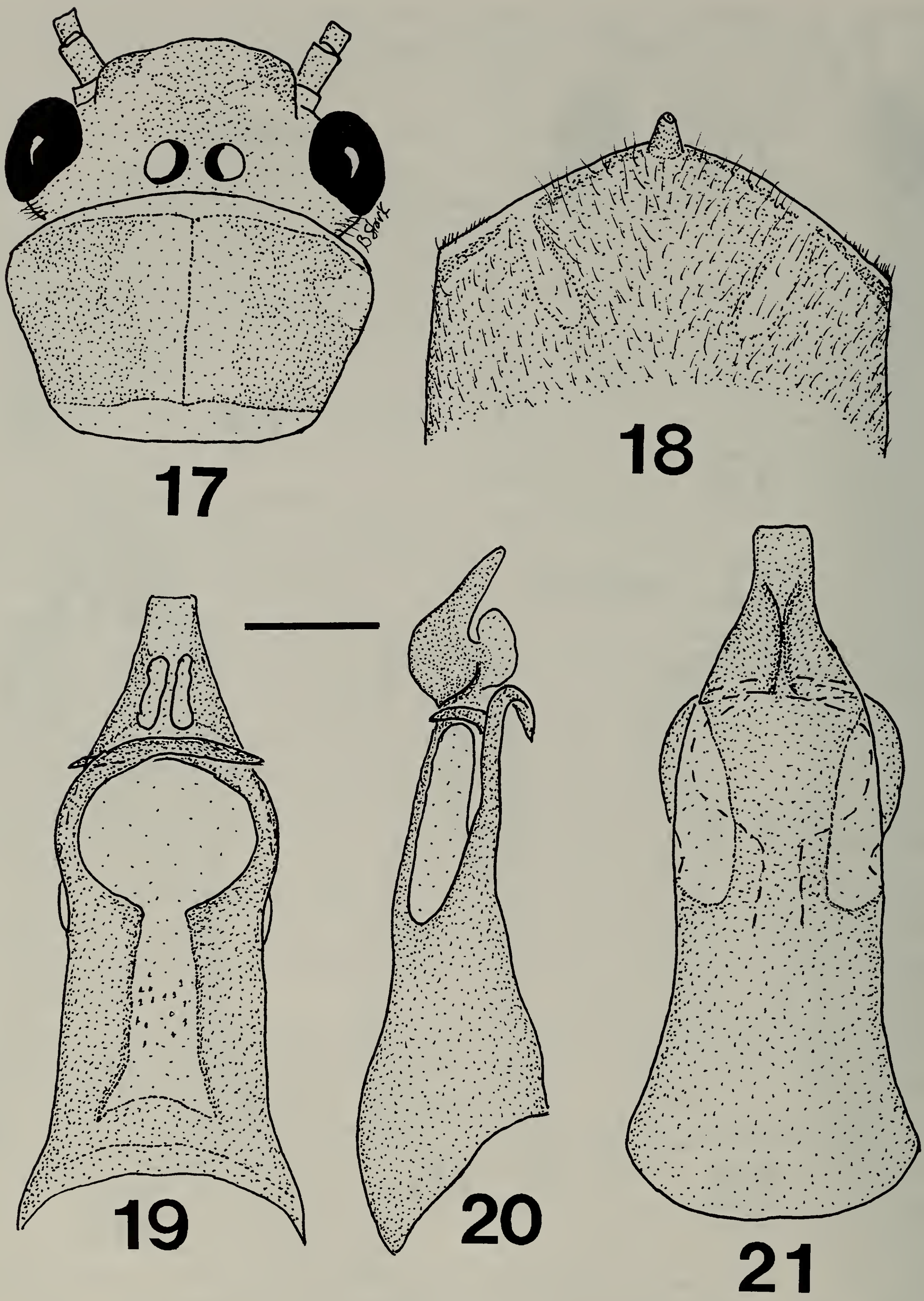
Diagnosis.—This species is similar to *A. chiquita* in general aedeagal structure but differs from that species in having small paired membranous ventral lobes (Fig. 17) and in having unmodified aedeagal hook apices (Fig. 17).

Anacroneuria cruza Stark

Anacroneuria cruza Stark, 1995:231. Holotype ♂, Exp. Culebra, N Duida, Territorio Federal Amazonas, Venezuela.



Figs. 12–16. *A. chaima* structures. 12. Head and pronotum. 13. Male sternum 9. 14. Aedeagus, ventral. 15. Aedeagus, lateral. 16. Aedeagus, dorsal. Scales: 0.6 mm (12), 0.3 mm (13), 0.15 mm (14–16).



Figs. 17–21. *A. claudia* structures. 17. Head and pronotum. 18. Male sternum 9. 19. Aedeagus, ventral. 20. Aedeagus, lateral. 21. Aedeagus, dorsal. Scales: 0.6 mm (17), 0.3 mm (18), 0.15 mm (19–21).
]

Material.—Guyana: Kanuku Mountains, Kumu River, 28–30 Apr 1995, O. S. Flint, 2 ♂ (USNM). Kanuku Mountains, Moco Moco River, 29 Apr 1995, O. S. Flint, 1 ♂ (USNM). Venezuela: Sucre, Rio Cocollar, 1.5 km SE Las Piedras de Cocollar, 810 m, 7–8 Apr 1995, R. Holzenthal, O. S. Flint, 4 ♂ (USNM, UCV).

Comments.—This species was previously known from Territorio Federal Amazonas, Venezuela (Stark 1995).

Anacroneuria karina, new species

Adult habitus.—Head yellow with a diffuse brown spot forward of ocelli; lappets brown. Irregular midlateral pronotal bands dark brown, median field pale, grading to pale brown (Fig. 22). Wing membrane pale brown, veins brown, R and Sc dark brown.

Male.—Forewing length 11 mm. Hammer thimble shaped, height greater than basal diameter (Fig. 23). Aedeagal apex simple, scoop shaped and broadly rounded; ventral membranous lobes narrow; dorsal keel well developed; hooks slender (Figs. 24–26).

Female.—Unknown.

Nymph.—Unknown.

Etymology.—The name honors the Kariña people of Venezuela and is used as a noun in apposition.

Types.—Holotype ♂ (USNM) and 7 ♂ paratypes (USNM, UCV) from Venezuela, Sucre, Rio Cocollar, 1.5 km SE Las Piedras de Cocollar, 810 m, 7–8 Apr 1995, R. Holzenthal, O. S. Flint.

Diagnosis.—Many species of *Anacroneuria* share the color pattern of *A. karina* and the aedeagus also bears a general similarity to that of other species such as *A. bari* and *A. arcuata* (Stark 1995). *Anacroneuria karina,* however, lacks the transverse dorsal aedeagal keel found in *A. arcuata* and the aedeagal apex is much longer and narrower in *A. bari.*

Anacroneuria llana Stark

Anacroneuria llana Stark, 1995:234. Holotype ♂, La Escalera, 108 km S Rio Cuyuni, Bolivar, Venezuela.

Material.—Guyana: Potaro River, Kaieteur Falls, 1350′, 21–23 Aug 1997, O. S. Flint, 9 ♂, 58 ♀ (USNM).

Comments.—This species was previously known from the holotype. The Guyana males agree with the holotype in all respects except in having falcate aedeagal hooks. The females collected with these males share the same color pattern (Fig. 63) and are associated on that basis. These females have eggs with a terminal spine similar to those of *A. blanca* (Stark 1995) and they also are similar in color pattern, size and in having an intersegmental band of microtrichia.

Female.—Forewing length 13–14 mm. Subgenital plate four lobed, outer lobes slightly longer. Median sclerite of sternum 9 densely hirsute, hairs slightly longer laterally. Intersegmental membrane covered with a dense microtrichia band (Fig. 64).

Anacroneuria makushi, new species

Adult habitus.—Head yellow; pronotum with diffuse midlateral brown bands (Fig. 27). Wing membrane transparent, veins pale.

Male.—Forewing length 9.5 mm. Hammer laterally compressed, height greater than basal diameter (Fig. 28). Aedeagal apex scoop shaped, tip blunt; ventral aspect with a pair of subapical membranous lobes; dorsal aspect with a long, low keel; dorsal sclerite basal to keel bearing an arcuate process; hooks irregularly scalloped on inner margin (Figs. 29–31).

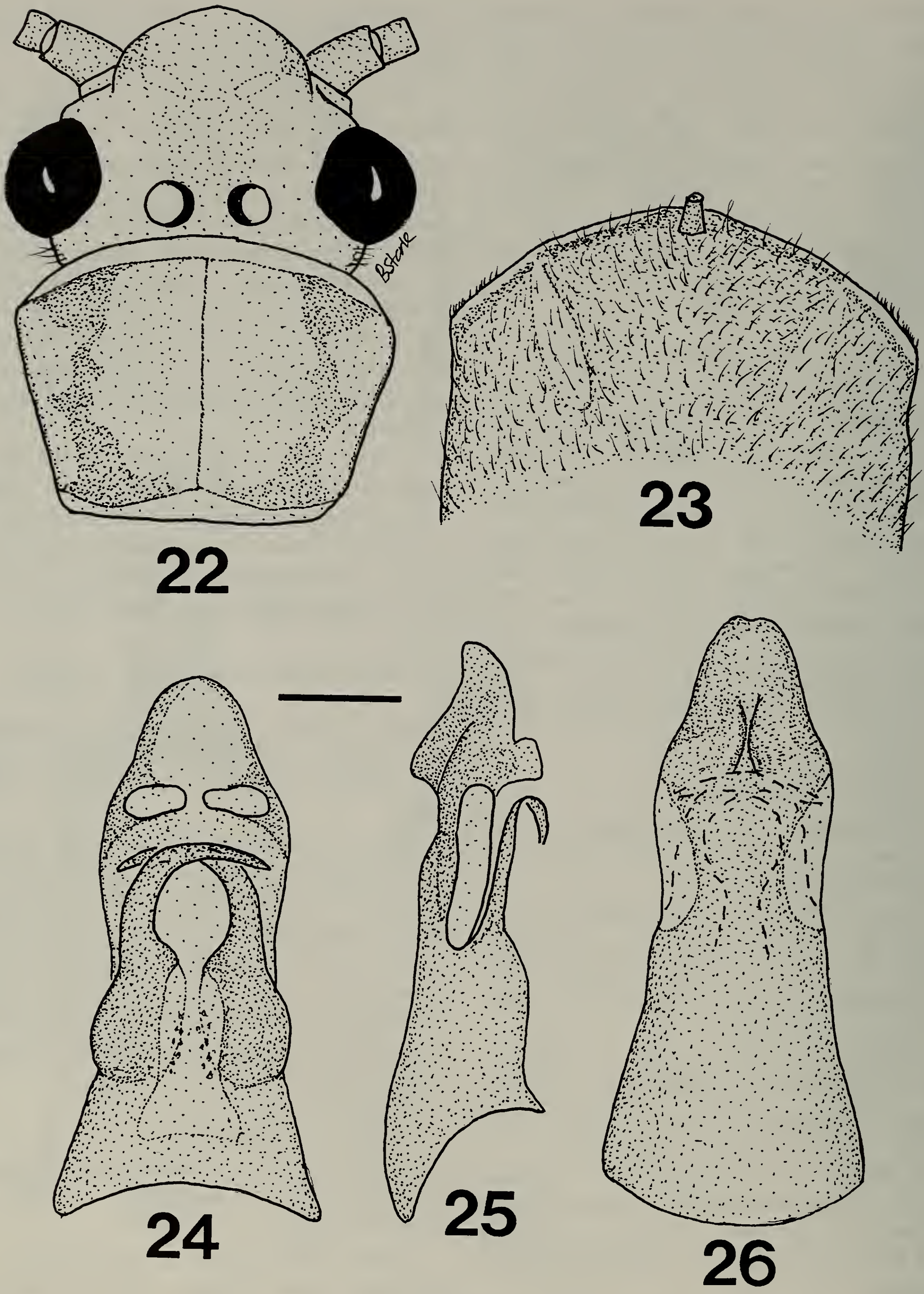
Female.—Unknown.

Nymph.—Unknown.

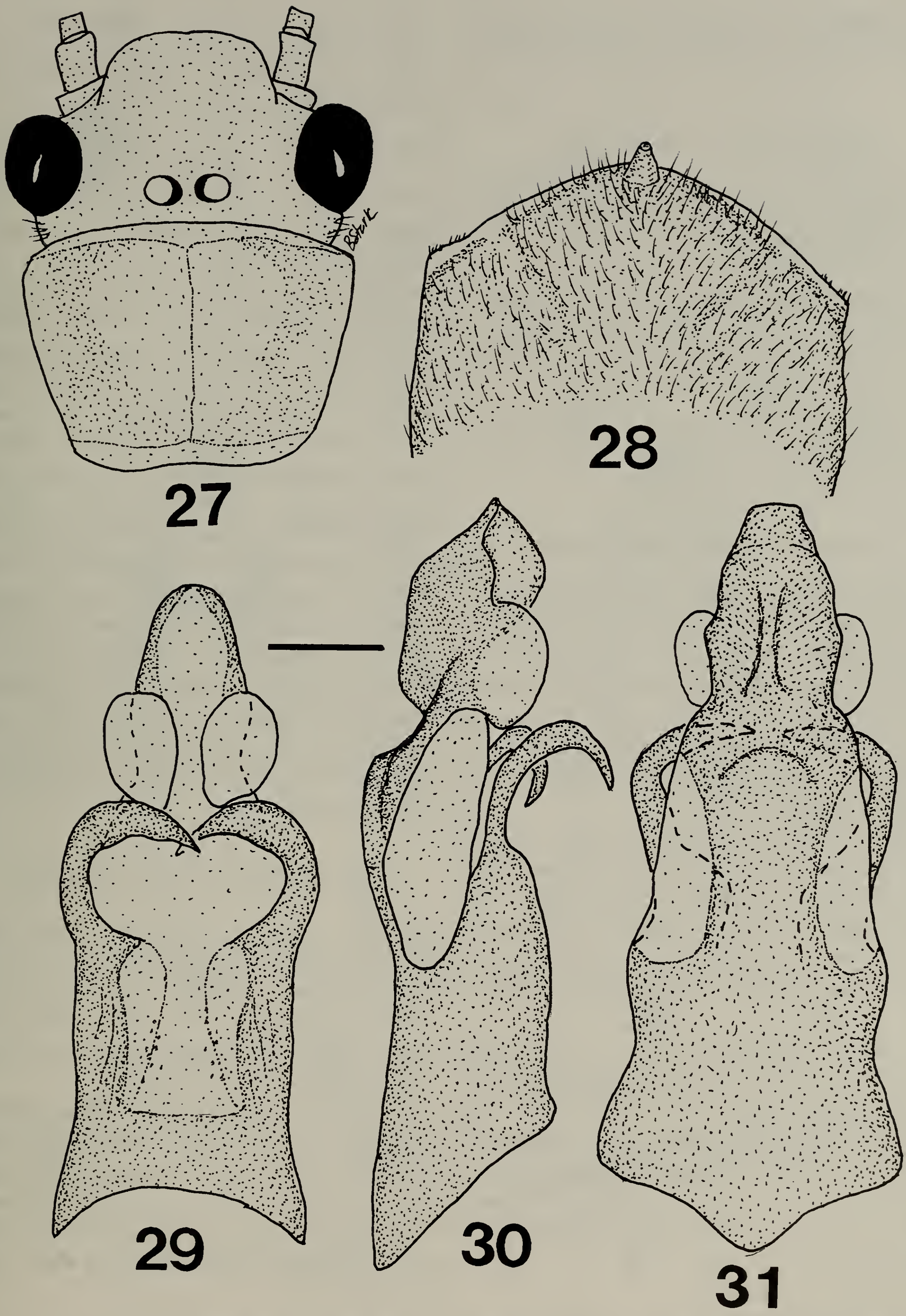
Etymology.—The name honors the Makushi people of Guyana and is used as a noun in apposition.

Types.—Holotype ♂ (pinned) and 2 ♂ paratypes from Guyana, Kanuku Mountains, Moco Moco River, 29 Apr 1995, O. S. Flint (USNM).

Diagnosis.—*A. makushi* is similar to *A. baniva* in aedeagal structure (Stark 1995). The most conspicuous difference between



Figs. 22–26. *A. karina* structures. 22. Head and pronotum. 23. Male sternum 9. 24. Aedeagus, ventral. 25. Aedeagus, lateral. 26. Aedeagus, dorsal. Scales: 0.6 mm (22), 0.3 mm (23), 0.15 mm (24–26).



Figs. 27–31. *A. makushi* structures. 27. Head and pronotum. 28. Male sternum 9. 29. Aedeagus, ventral. 30. Aedeagus, lateral. 31. Aedeagus, dorsal. Scales: 0.6 mm (27), 0.3 mm (28), 0.15 mm (29–31).

these species is the arcuate process on the dorsal aedeagal sclerite in *A. makushi* (Fig. 31).

Anacroneuria paleta Stark

Anacroneuria paleta Stark, 1995:236. Holotype ♂, 4 km S Santo Domingo, Merida, Venezuela.

Material.—Venezuela: Trujillo, Quebrada Potrerito, 7.5 km NE Bocono, 1530 m, 29–30 Apr 1995, R. Holzenthal, C. Cressa, Gutic, 31 ♂ (UMSP, UCV, BPS).

Comments.—This species was previously recorded from the Venezuelan states of Barinas and Merida (Stark 1995).

Anacroneuria paria, new species

Adult habitus.—Very diffuse brown pattern over ocelli and midlaterally on pronotum (Fig. 32). Wing membrane pale with distinctive longitudinal brown band extending from anal cell to tip; band narrow in proximal half, expanded at the cord, but interrupted by a large circular "window" beyond the cord (Fig. 37).

Male.—Forewing length 10 mm. Hammer thimble shaped, height less than basal diameter (Fig. 33). Aedeagal apex with five dorsal lobes and a short narrow keel; ventral aspect of mesal lobe scoop shaped, without membranous lobes; hooks slender (Figs. 34–36).

Female.—Forewing length 12 mm. Subgenital plate four lobed; lateral lobes larger than inner lobes, mesal notch deep and V-shaped. Transverse sclerite of sternum 9 wide, sinuate and prominent, mesal sclerite T-shaped; lateral lobes of mesal sclerite with prominent setae, stalk covered with minute setae (Fig. 54).

Nymph.—Unknown.

Etymology.—The name is based on the Paria Peninsula and is used as a noun in apposition.

Types.—Holotype ♂ (pinned) and 9 ♀ paratypes from Venezuela, Sucre, Rio Cocollar, 1.5 km SE Las Piedras de Cocollar, 810 m, 7–8 Apr 1995, R. Holzenthal, O. S. Flint (USNM). Additional paratypes; Venezuela: Sucre, Parque Nacional Peninsula de Paria, Uquire, Rio La Vidua, 15 m, 30 Mar–1 Apr 1995, R. Holzenthal, O. S. Flint, C. Cressa, 3 ♀ (UCV). Sucre, Peninsula de Paria, Puerto Viejo, "Rio el Pozo", 20 m, 3 Apr 1995, R. Holzenthal, O. S. Flint, C. Cressa, 6 ♀ (USNM).

Diagnosis.—This species is similar to *A. bifasciata* (Pictet) and *A. vistosa* Stark in displaying a distinctive wing pigmentation pattern, however *A. paria* is readily distinguished from both species on the basis of color pattern, aedeagal shape and details of female sternum 9 (Stark 1995). *Anacroneuria bifasciata* adults have tiny ocelli, a prominent dark mesal pronotal band and the wing pigmentation is separated into three distinct transverse bands. The aedeagal apex of *A. bifasciata* also bears five dorsal lobes but the mesal lobe lacks a keel and the mesal sclerite of the female 9th sternum is triangular and evenly setose. The aedeagal apex of *A. vistosa* is trilobed and the mesal sclerite of the female 9th sternum is evenly setose.

Anacroneuria perija, new species

Adult habitus.—Center of frons bright yellow, anterior head margin, posterolateral head margins, and ocellar area dark brown. Median pronotal stripe pale, lateral third brown (Fig. 38). Wing membrane brown, veins dark brown, Sc pale.

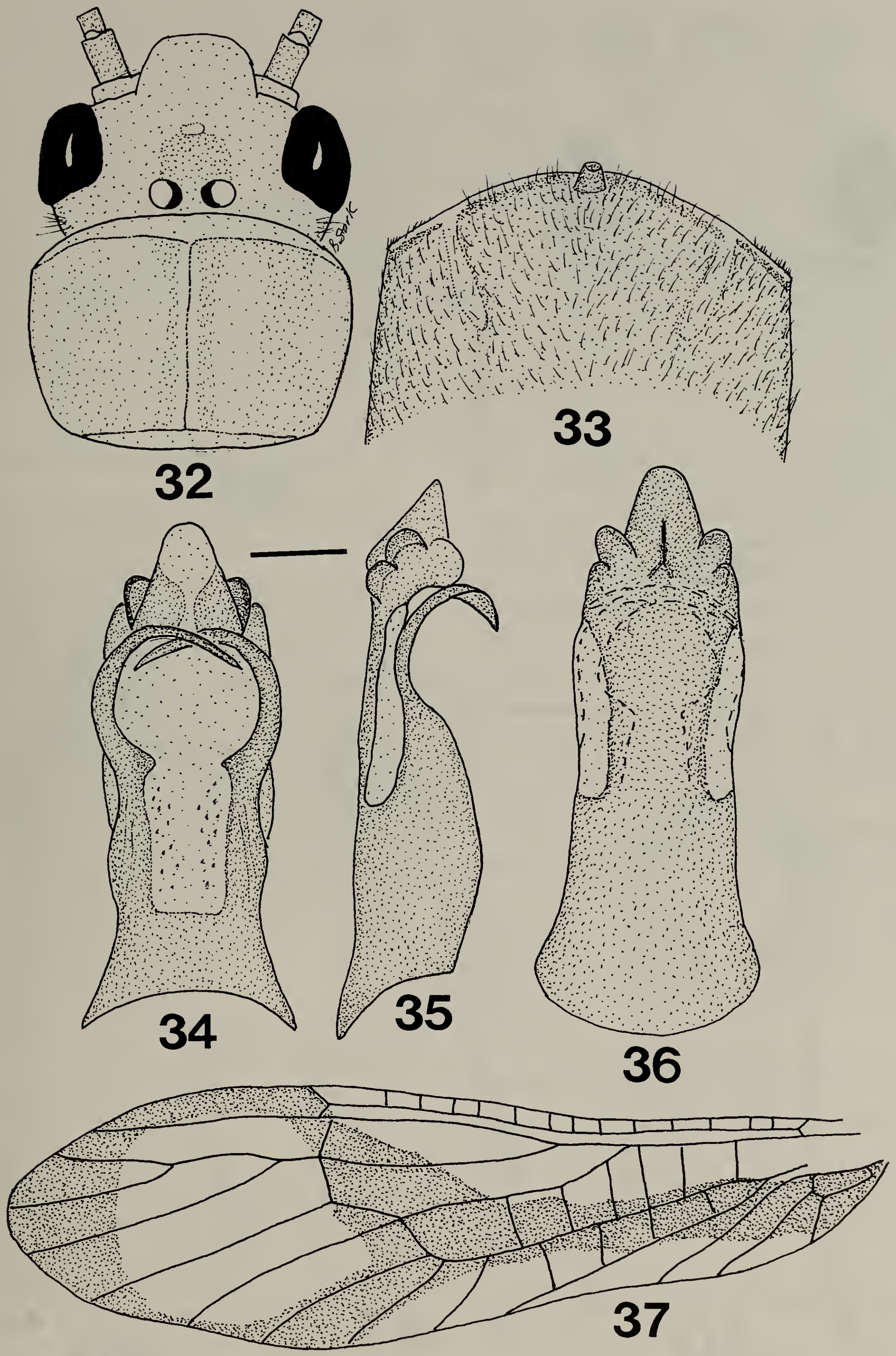
Male.—Forewing length 9 mm. Hammer cylindrical, height greater than basal diameter (Fig. 39). Ventral aedeagal apex a short scoop covered with a pair of membranous lobes; dorsal aspect with a wide keel and a low U-shaped region; hooks slender (Figs. 40–42).

Female.—Unknown.

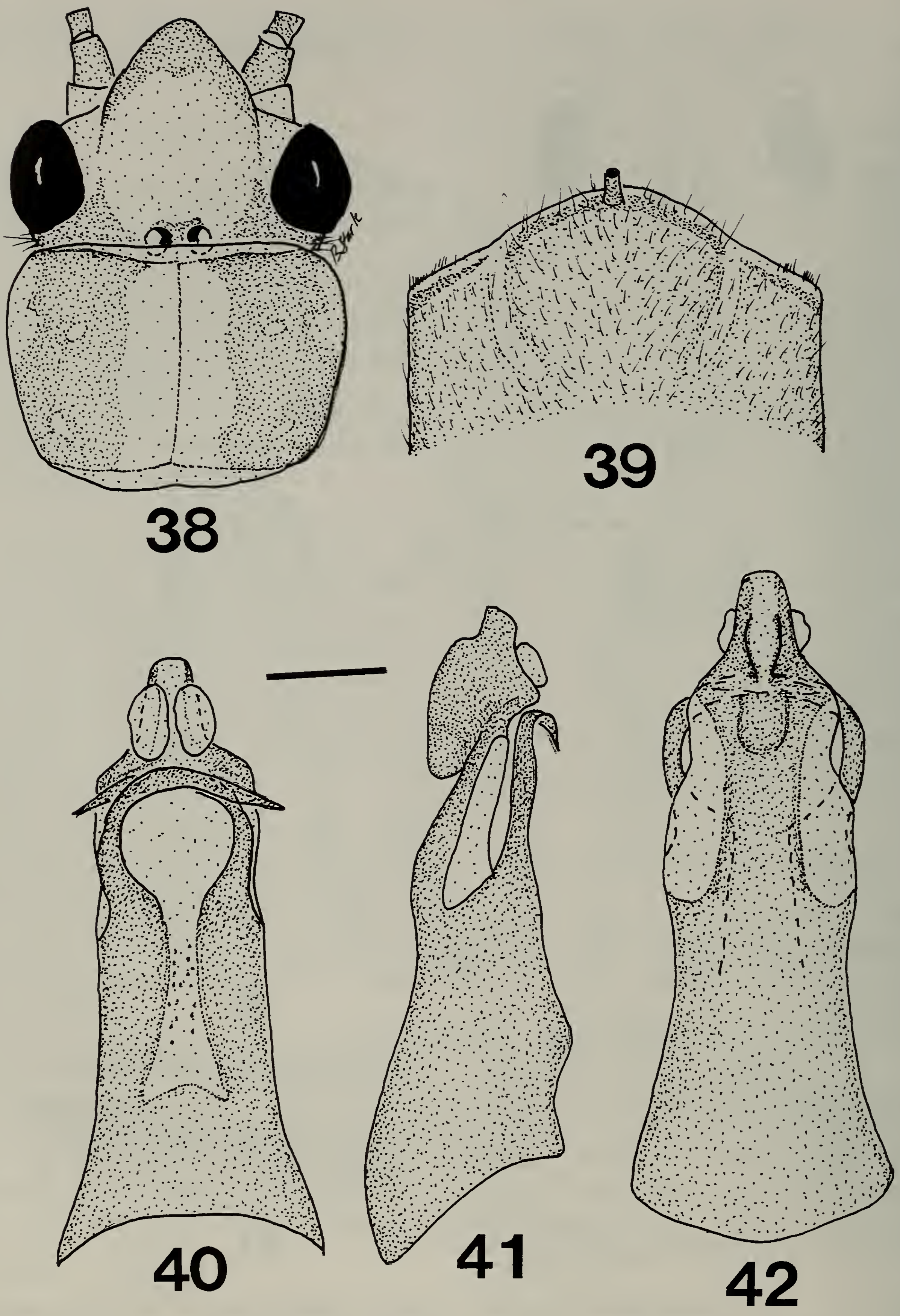
Nymph.—Unknown.

Etymology.—The name is based on the type locality and is used as a noun in apposition.

Types.—Holotype ♂ from Venezuela,



Figs. 32–37. *A. paria* structures. 32. Head and pronotum. 33. Male sternum 9. 34. Aedeagus, ventral. 35. Aedeagus, lateral. 36. Aedeagus, dorsal. 37. Forewing. Scales: 1.2 mm (37), 0.6 mm (32), 0.3 mm (33), 0.15 mm (34–36).



Figs. 38–42. *A. perija* structures. 38. Head and pronotum. 39. Male sternum 9. 40. Aedeagus, ventral. 41. Aedeagus, lateral. 42. Aedeagus, dorsal. Scales: 0.6 mm (38), 0.3 mm (39), 0.15 mm (40–42).

Zulia, Parque Nacional Perija, Rio Negro, Toromo, 360 m, 15 Jan 1994, R. Holzenthal, C. Cressa, Rincón (USNM).

Diagnosis.—This species keys to *A. baniva* in Stark (1995) but the aedeagal apex is much shorter and narrower than in that species, and the dorsal keel and subapical U-shaped process of *A. perija* also will distinguish the two. Although the condition of *A. baniva* type material left much of the color pattern obscured, it is clear that species lacks the distinctive head pattern of *A. perija.*

Anacroneuria phantoma (Banks)

Neoperla phantoma Banks, 1914:609. Holotype ♂, Mallali, Guyana.

Adult habitus.—Head yellow with diffuse yellow brown lappets. Pronotum with pale median stripe and broad, diffuse brown midlateral bands; lateral margins pale (Fig. 43). Wing membrane and veins pale.

Male.—Forewing length 9–10 mm. Hammer laterally compressed, height greater than basal diameter (Fig. 44). Aedeagal apex bluntly pointed, shoulders undeveloped. Dorsal keel long, ventral membranous lobes large. Hooks scalloped along inner margins (Figs. 45–47).

Female.—Unknown.

Nymph.—Unknown.

Material.—Guyana: Mallali, Mar, H. S. Parish, 1 ♂ (holotype) (MCZ). Potaro River, Kaieteur Falls, 1350′, 21–23 Aug 1997, O. S. Flint, 4 ♂ (USNM).

Diagnosis.—This species is quite similar to and perhaps synonymous with *A. baniva* (Stark 1995). The subtle differences in aedeagal structure include a small apical notch, decurved apex and low dorsal keel in *A. baniva.* The holotype of *A. phantoma* has a blunt aedeagal apex, straight in lateral aspect and a more pronounced dorsal keel (Figs. 45–47). *Anacroneuria makushi* represents another member of this complex with a more robust aedeagal apex and a transverse arcuate keel (Figs. 29–31).

Comments.—The type locality above Linden on the Demerara River is one of the H. S. Parish sites of 1912–13 (Adams, pers. comm.).

Anacroneuria pictipes Klapálek

Anacroneuria pictipes Klapálek, 1923:21. Holotype ♀, Haut-Carsevenne, Guyana.

Adult habitus.—(Modified from Klapálek, 1923) Body ochre yellow, pronotum darker brown along the posterior margins and near lateral margins (Fig. 48). Wing membrane and veins brown; R dark brown, costal border pale (Fig. 53).

Male.—Forewing length 10 mm. Hammer laterally compressed at tip, height greater than basal diameter (Fig. 49). Aedeagal apex truncate to emarginate, arising from low broadly rounded shoulders; dorsal keel triangular, hooks slender (Figs. 50–52).

Female.—Forewing length 11 mm. Subgenital plate weakly four-lobed. Median field of sternum nine weakly sclerotized and sparsely hirsute. Posterior margin of nine without transverse sclerite (Fig. 55).

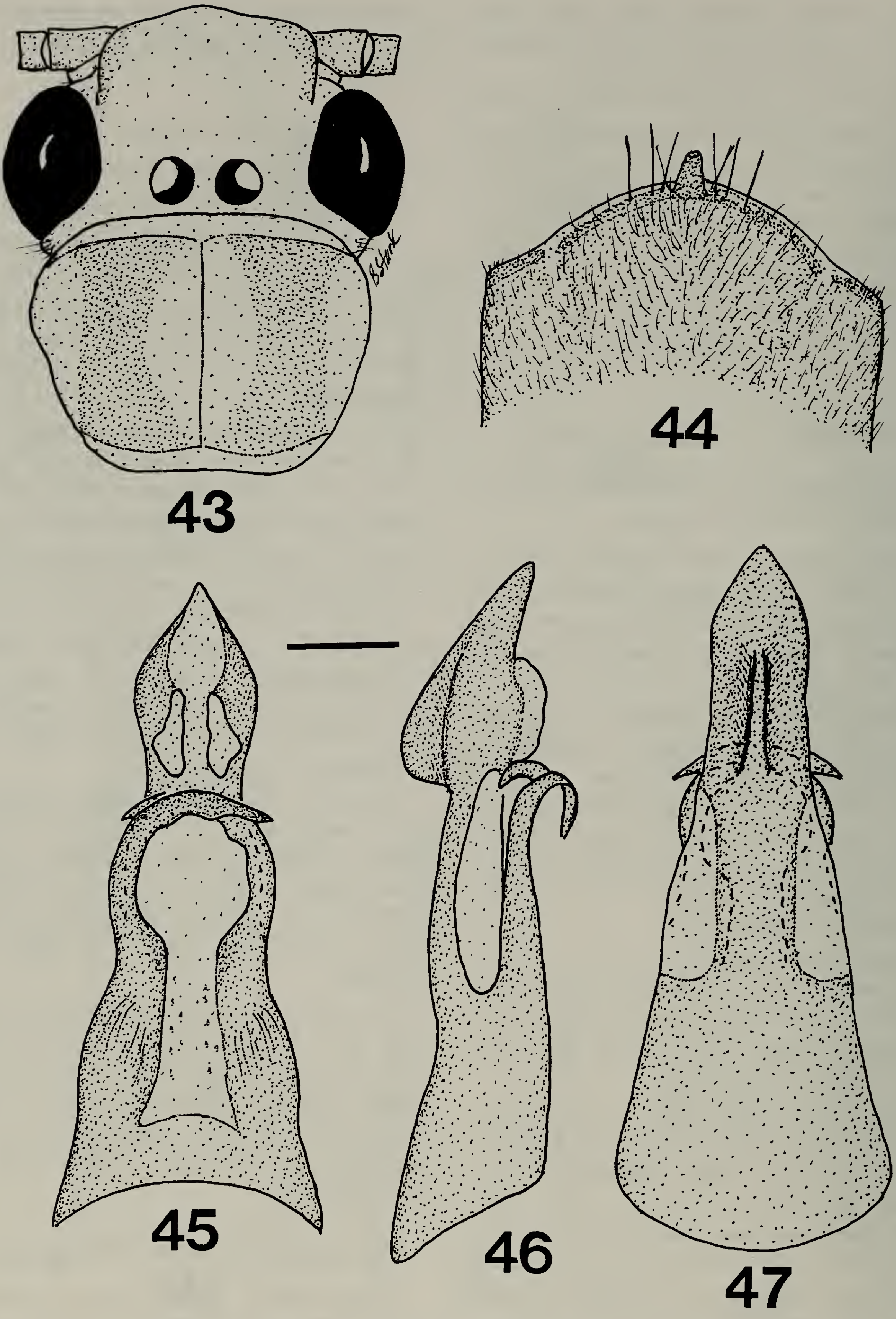
Nymph.—Unknown.

Material.—Guyana [French Guiana ?]: Haut-Carsevenne, 1878, F. Geay, 1 ♀ (holotype) (NMH). Guyana: Kanuku Mountains, Moca Moca River, 29 Apr 1995, O. S. Flint, 2 ♂ (USNM). Paramaketoi Village, 2350′, 24–25 Aug 1997, O. S. Flint, 3 ♂ (USNM).

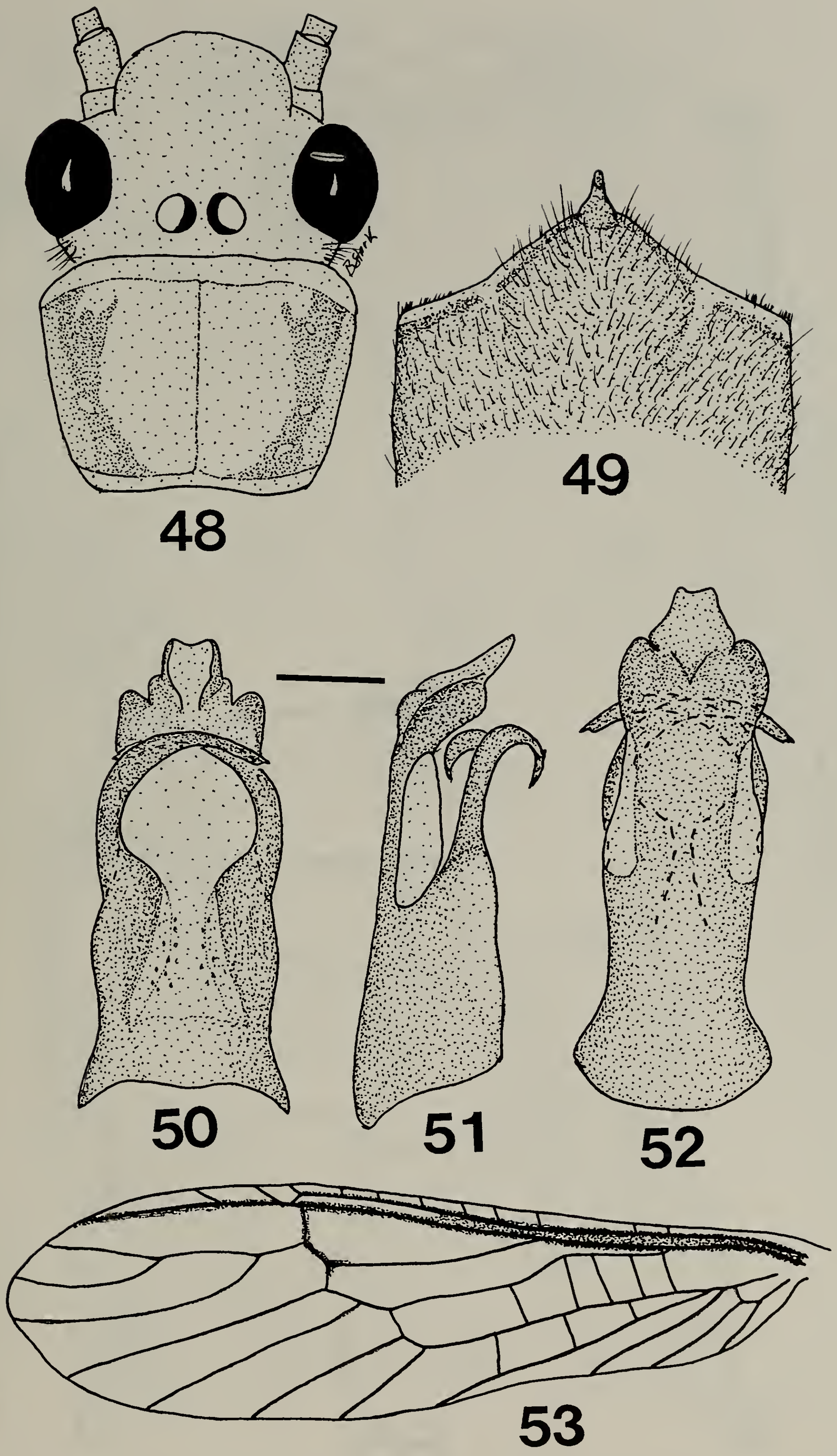
Comments.—This association of males with the holotype female is based on the distinctive wing pigmentation pattern. Females collected with the males at Moca Moca River represent another species, described below as "GU-1" which lacks this wing pattern.

Anacroneuria timote, new species

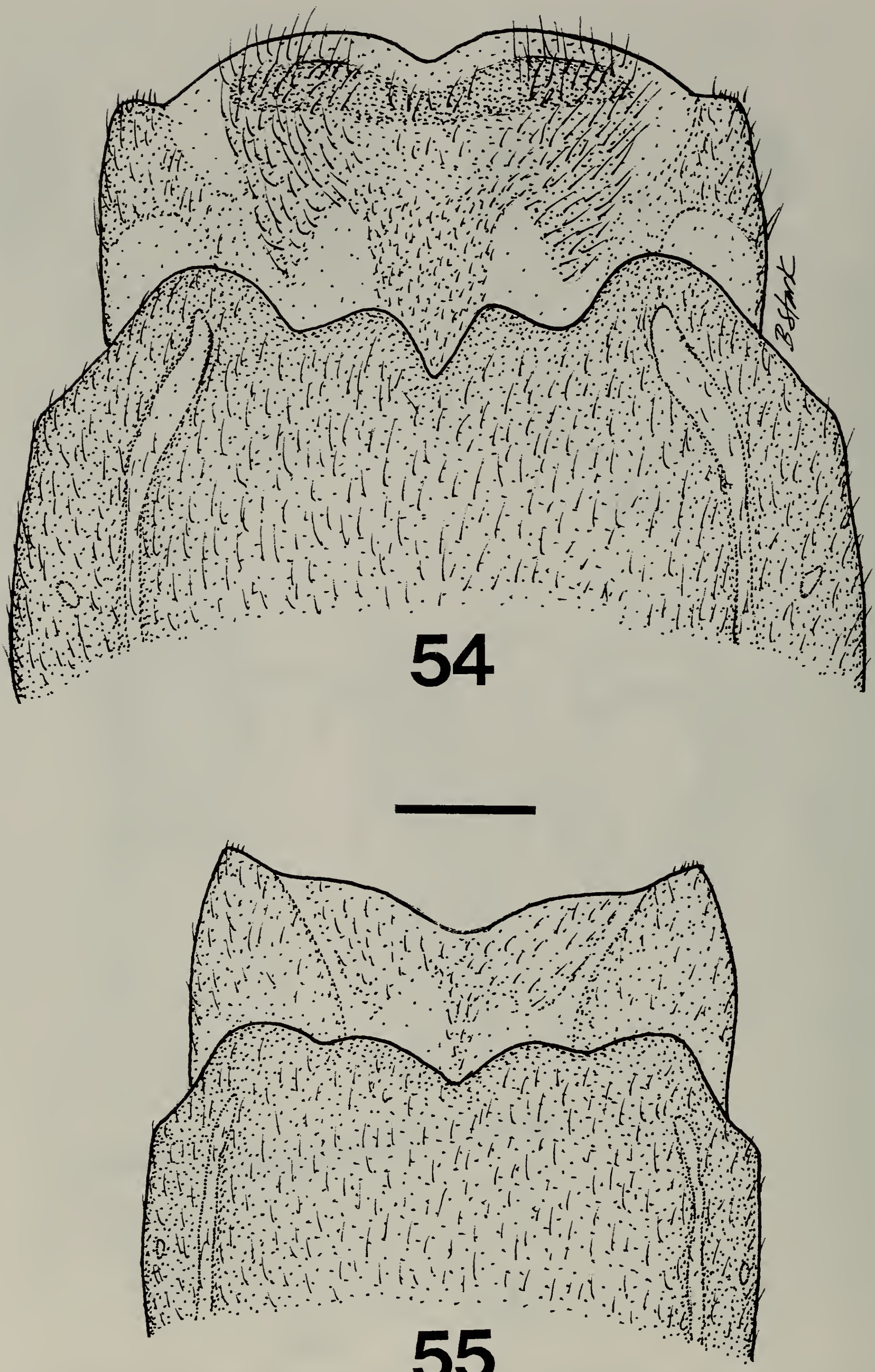
Adult habitus.—Head yellow with diffuse brown area forward of ocelli and M-line; lappets brown. Broad median pronotal stripe pale, irregular midlateral stripes brown, lateral margins pale (Fig. 56). Wing membrane transparent, C and Sc veins pale, R vein dark brown.



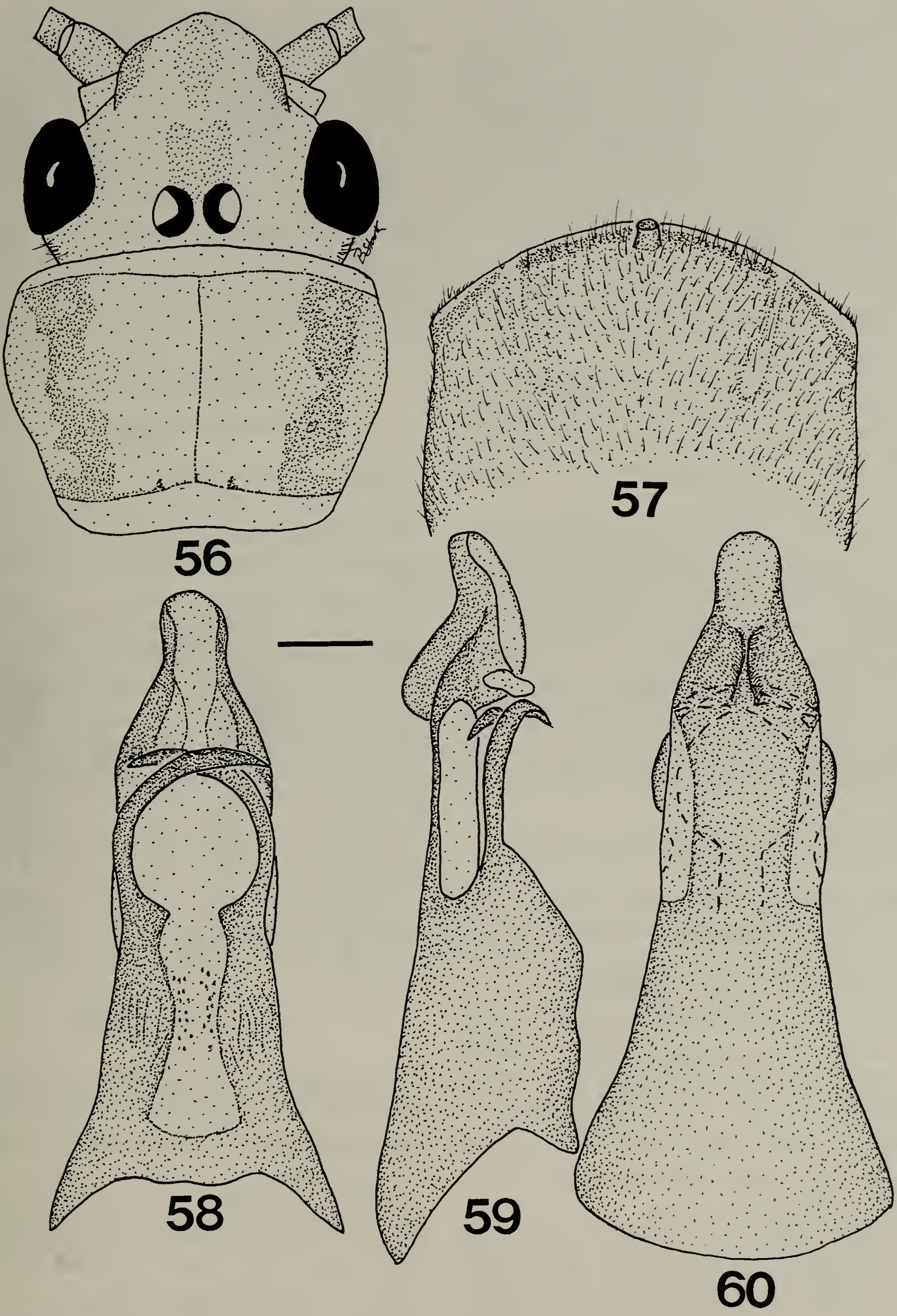
Figs. 43–47. *A. phantoma* structures. 43. Head and pronotum. 44. Male sternum 9. 45. Aedeagus, ventral. 46. Aedeagus, lateral. 47. Aedeagus, dorsal. Scales: 0.6 mm (43), 0.3 mm (44), 0.15 mm (45–47).



Figs. 48–53. *A. pictipes* structures. 48. Head and pronotum. 49. Male sternum 9.50. Aedeagus, ventral. 51. Aedeagus, lateral. 52. Aedeagus, dorsal. 53. Forewing. Scales: 1.2 mm (53), 0.6 mm (48), 0.3 mm (49), 0.15 mm (50–52).



Figs. 54–55. *Anacroneuria* female sterna 8 and 9. 54. *A. paria.* 55. *A. pictipes.* Scale: 0.3 mm.



Figs. 56–60. *A. timote* structures. 56. Head and pronotum. 57. Male sternum 9. 58. Aedeagus, ventral. 59. Aedeagus, lateral. 60. Aedeagus, dorsal. Scales: 0.6 mm (56), 0.3 mm (57), 0.15 mm (58–60).

Male.—Forewing length 17 mm. Hammer thimble shaped, height less than basal diameter (Fig. 57). Aedeagal apex simple, scoop shaped with broadly rounded tip; ventral aspect with an inconspicuous pair of membranous lobes; dorsal keel well developed, hooks slender (Figs. 58–60).

Female.—Unknown.

Nymph.—Unknown.

Etymology.—The name honors the Timote people of Venezuela and is used as a noun in apposition.

Types.—Holotype ♂ (USNM) and 4 ♂ paratypes (UCV, UMSP) from Venezuela, Tachira, Quebrada Los Mirtos, 8 km S El Cobre, 2400 m, 22 Apr 1995, R. Holzenthal, C. Cressa, Gutic.

Diagnosis.—The head and pronotal pattern, size, and general aedeagal structure of this species is similar to *A. shamatari* (Stark 1995). The most conspicuous difference in aedeagal structure involves the membranous area between the hooks. In *A. shamatari* this area terminates well short of the aedeagal base whereas in *A. timote* it extends almost to the aedeagal base (Fig. 58).

Anacroneuria wapishana, new species

Adult habitus.—Head dark brown except for anterior margin and callosities. Pronotum dark brown except for V-shaped median band and small anterolateral areas (Fig. 61). Fore and mid femora and tibiae dark brown; hind femora yellow in basal two thirds, dark brown apically. Wing membrane brown except for transparent window at cord; veins dark brown except for pale costal area; wing tips dark brown.

Male.—Unknown.

Female.—Forewing length 11 mm. Subgenital plate four lobed; outer lobes small, notches shallow; median notch deep. Mesal sclerite of sternum 9 with short broad median field of fine setae, lateral fields with long thick bristles; transverse posterior sclerite indistinct (Fig. 62).

Nymph.—Unknown.

Etymology.—The name honors the Wapishana people of Guyana and is used as a noun in apposition.

Types.—Holotype ♀ from Guyana, Potaro River, Kaieteur Falls, 1350′, 21–23 Aug 1997, O. S. Flint (USNM).

Diagnosis.—The exceptional color pattern of the holotype is the basis for naming this species from a female. The species bears some similarity to *A. dourada* (Jewett 1960) but is much smaller and has a more extensive area of dark pigment on the frons.

Unassociated Females

Anacroneuria GU-1

Adult habitus.—Head yellow, without dark pattern. Pronotum with irregular brown midlateral bands and a broad yellow median band. Wing membrane transparent, veins pale.

Female.—Forewing length 11 mm. Subgenital plate with four subequal lobes. Mesal sclerite of sternum 9 with broad median field of short, fine setae, lateral field with longer thick bristles; posterior margin with a narrow U-shaped median sclerite (Fig. 65).

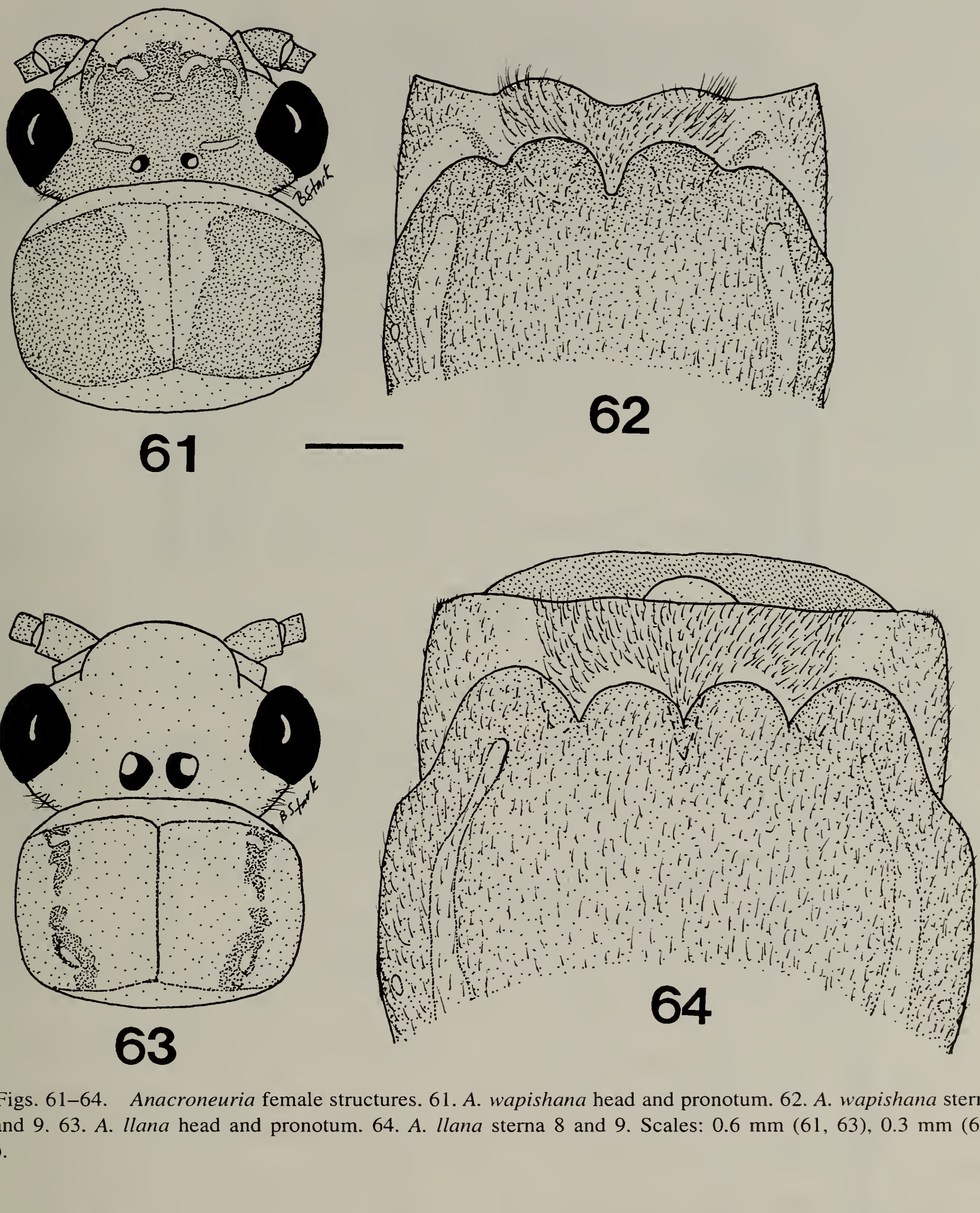
Material.—Guyana: Kanuku Mountains, Moco Moco River, 29 Apr 1995, 4 ♀, O. S. Flint (USNM). Kanuku Mountains, Kumu River and falls, 28–30 Apr 1995, 1 ♀, O. S. Flint (USNM).

Anacroneuria GU-2

Adult habitus.—Head yellow brown, lappets pale. Pronotum with diffuse brown midlateral bands. Wing membrane transparent, veins pale.

Female.—Forewing length 11 mm. Subgenital plate four lobed; lateral lobes wide and offset from narrow median lobes by shallow acute notches. Mesal sclerite of sternum 9 with median field covered with fine short setae which form a sagittate patch separated from lateral patches covered with longer bristles; posterior sclerite absent (Fig. 66).

Material.—Guyana: Dubulay Ranch, Ar-



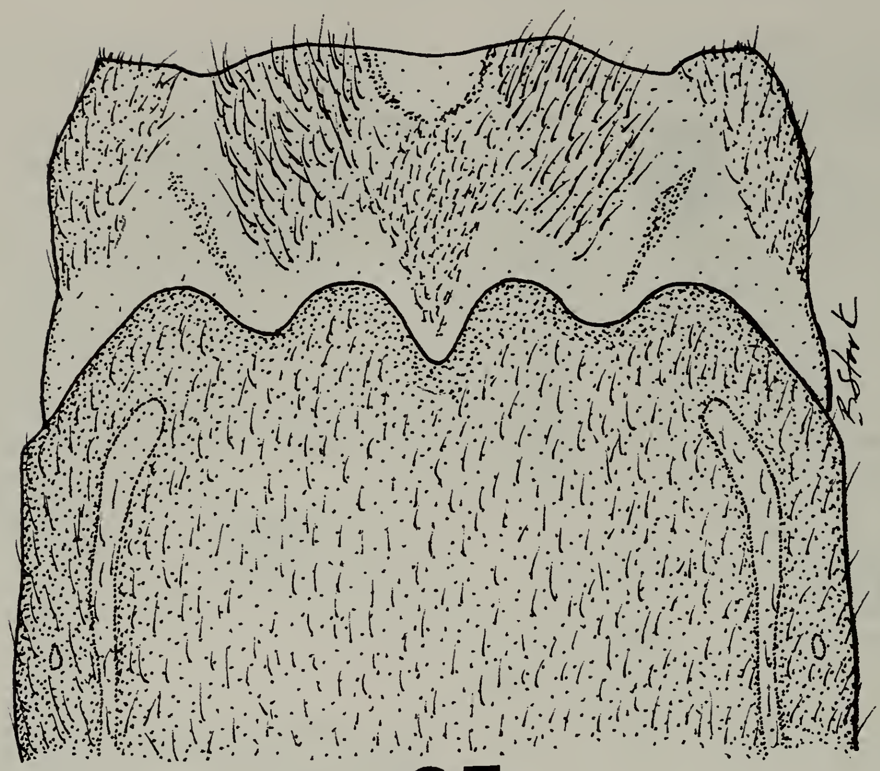
Figs. 61–64. *Anacroneuria* female structures. 61. *A. wapishana* head and pronotum. 62. *A. wapishana* sterna 8 and 9. 63. *A. llana* head and pronotum. 64. *A. llana* sterna 8 and 9. Scales: 0.6 mm (61, 63), 0.3 mm (62, 64).

amatani Creek, 15–18 Apr 1995, 2 ♀, O. S. Flint (USNM).

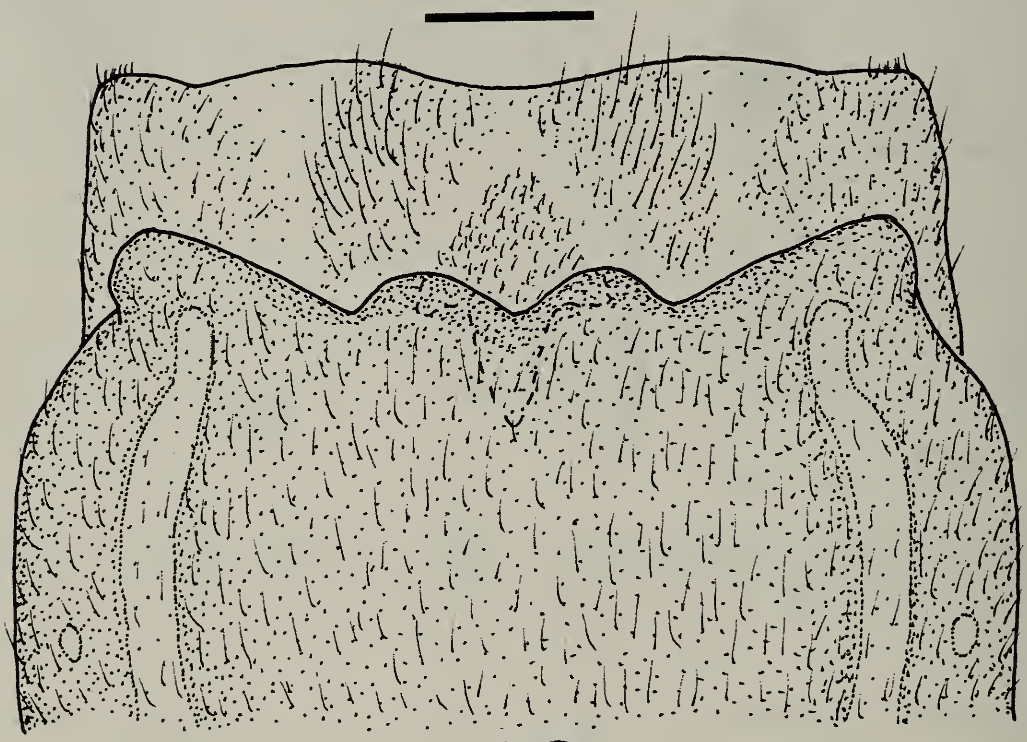
Anacroneuria GU-3

Adult habitus.—Head yellow with diffuse brown pigment forward of ocelli; lappets brown. Pronotum with irregular diffuse brown spots scattered over midlateral area (Fig. 67). Tibiae banded, basal and apical bands brown, median band pale. Wing membrane transparent except for pale brown tips which accent an obscure window at the cord; veins brown, R darker, costal area pale.

Female.—Forewing length 10 mm. Subgenital plate four lobed; outer lobes small, notches shallow, median notch deep and U-shaped. Median sclerite of sternum 9 with

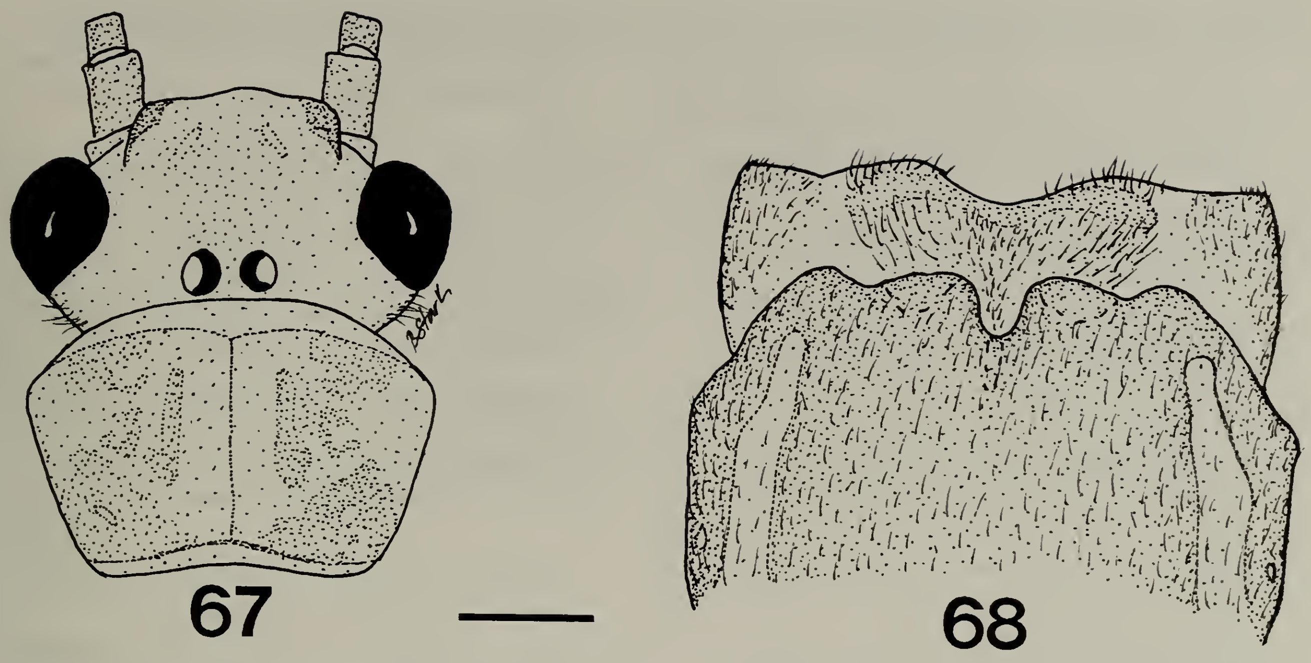


65



66

Figs. 65–66. *Anacroneuria* female sterna 8 and 9. 65. *Anacroneuria* GU-1. 66. *Anacroneuria* GU-2. Scale: 0.3 mm.



Figs. 67–68. *Anacroneuria* GU-3 female structures. 67. Head and pronotum. 68. Sterna 8 and 9. Scales: 0.6 (67), 0.3 (68).

long narrow stem; stem and mesal field with short, fine setae, lateral areas with thicker setae. Transverse sclerite sinuate (Fig. 68).

Material.—Guyana: Mazaruni-Potaro District, Takutu Mountains, 20 Dec 1983, P. J. Spangler, 1 ♀ (USNM). Same location, 12 Dec 1983, P. J. Spangler, R. A. Faitoute, P. D. Perkins, 1 ♀ (USNM).

Provisional Key for Male *Anacroneuria* from Venezuela, Guyana, and Suriname (Modified from Stark 1995)

1. Wings banded in amber and dark brown 2
Wings variable, but without bands . . . 3
2. Dark pigment separated into basal, median and apical bands . . . . . *A. bifasciata*
Dark pigment forming a narrow longitudinal band from base to cord (Fig. 37) . . . . *A. paria*
3. Forewing length greater than 13.5 mm 4
Forewing length less than 13 mm . . 11
4. Hammer low, scarcely elevated above sternum . . . . *A. chorrera*
Hammer length equal to apical diameter 5
5. Hammer apex quadrate; aedeagal hook apices footlike . . . . *A. cuadrada*
Hammer apex circular; aedeagal hooks without footlike apices 6
6. Dorsum of aedeagus with a transverse, subapical arcuate lobe . . . . . *A. arcuata*
Dorsum of aedeagus without arcuate lobe 7
7. Hammer tiny; aedeagal apex notched . . . . *A. muesca*
Hammer thimble shaped; aedeagal apex rounded 8
8. Aedeagal apex strongly trilobed; pale mesal pronotal band not extending laterally beyond ocelli . . . . . *A. fenestrata*
Aedeagal apex simple; pale mesal pronotal stripe wide, extending laterally beyond ocelli 9
9. Aedeagal apex abruptly narrowed at shoulder (Fig. 58) 10
Aedeagal apex gradually tapered . . . . *A. paleta*
10. Membranous area between hooks extends almost to aedeagal base (Fig. 58) . . . . *A. timote*
Membranous area between hooks extends far short of aedeagal base . . . . *A. shamatari*
11. Aedeagal apex simple 12
Aedeagal apex multilobed 25
12. Aedeagal hooks straight, daggerlike . . . . *A. cruza*
Aedeagal hooks curved, scythelike . . . 13

13. Apex of aedeagal hooks fingerlike, aedeagal apex surmounting a distinct neck . . . . *A. digitata*

Apex of aedeagal hooks not fingerlike, subapical area of aedeagus without neck 14

14. Ventral aspect of aedeagus with a conspicuous pair of membranous lobes . . 15

Ventral aspect of aedeagus with membranous lobes absent or inconspicuous 22

15. Dorsal keel formed by a pair of widely spaced ridges (Fig. 16); head with a conspicuous dark area at ocelli (Fig. 12) 16

Ridges of dorsal keel closely spaced (Fig. 31); head with diffuse or pale ocellar pigment (Fig. 27) 17

16. Keel arms divergent anteriorly (Fig. 16); occipital area pale (Fig. 12) . . . . *A. chaima*

Keel arms convergent anteriorly (Fig. 42); occipital area dark (Fig. 38) . . . . *A. perija*

17. Inner margins of aedeagal hooks scalloped (Fig. 29) 18

Inner margins of aedeagal hooks smoothly curved (Fig. 24) 20

18. Aedeagus with a dorsomesal arcuate keel (Fig. 31) . . . . *A. makushi*

Aedeagus without dorsomesal arcuate keel 19

19. Aedeagal apex notched, decurved in lateral aspect . . . . *A. baniva*

Aedeagal apex rounded, straight in lateral aspect (Figs. 45–46) *A. phantoma*

20. Membranous ventral aedeagal lobes wider than long (Fig. 24); submarginal pronotal bands narrow (Fig. 22) . . . . *A. karina*

Membranous ventral aedeagal lobes longer than wide (Fig. 19); submarginal pronotal bands wide (Fig. 17) . . . 21

21. Aedeagal apex truncate (Fig. 19); ventral membranous aedeagal lobes small (Fig. 19) . . . . *A. claudiae*

Aedeagal apex pointed (Fig. 9); ventral membranous aedeagal lobes large (Fig. 9) . . . . *A. arawak*

22. Aedeagal apex gradually narrowed to a point . . . . *A. bari*

Aedeagal apex truncate or broadly rounded 23

23. Aedeagus with a small ventral membranous lobe . . . . *A. chiquita*

Aedeagus without ventral membranous lobe 24

24. Projecting apex of aedeagus subequal to shoulder . . . . *A. llana*

Projecting apex of aedeagus about twice as long as shoulder . . . . *A. blanca*

25. Aedeagal apex with a dorsolateral pair of small hornlike processes 26

Aedeagal apex without hornlike processes 27

26. Hornlike aedeagal processes acute and conspicuous in ventral aspect . . . . *A. caraca*

Hornlike aedeagal processes rounded and inconspicuous in ventral aspect . . . . *A. aroucana*

27. Dorsal aedeagal keel V-shaped (Fig. 52) 28

Dorsal aedeagal keel not V-shaped . . . 29

28. R and basal half of Sc vein covered with dark brown pigment (Fig. 53) . . . . *A. pictipes*

R and basal half of Sc without constrasting pigment band . . . . . *A. achagua*

29. Ventral aspect of aedeagus with a large membranous lobe . . . . *A. pequena*

Ventral aspect of aedeagus without membranous lobe 30

30. Lateral aedeagal lobes scarcely projecting . . . . *A. menuda*

Lateral aedeagal lobes distinctly projecting 31

31. Lateral aedeagal lobes about as wide as median lobe 32

Lateral aedeagal lobes about half as wide as median lobe . . . . . . *A.* sp VZ-10

32. Wings with a large transparent spot beyond cord, and an irregular transparent costal band . . . . *A. vistosa*

Wings rather uniformly pigmented . . . . *A. pinza*

Acknowledgments

I thank R. Holzenthal, University of Minnesota, and O. S. Flint and N. Adams, United States National Museum, for the loan of specimens. I also thank P. Zwick and curators at the California Academy of Science and the Museum of Comparative Zoology

for their help in arranging loans of type material.

Literature Cited

Banks, N. 1914. New neuropteroid insects, native and exotic.—Proceedings of the Academy of Natural Science of Philadelphia 66:608–632.

Jewett, S. G. 1960. Two new species of *Anacroneuria* (Plecoptera) from Goiás, Brazil.—Los Angeles County Museum Contributions in Science 36: 1–4.

Kimmins, D. E. 1948. A new species of *Anacroneuria* (Plecoptera, Perlidae) from Trinidad.—The Proceedings of the Royal Entomological Society of London, Series B 17:105–106.

Klapálek, F. 1923. Plécoptères nouveaux.—Annales de la Sociête Entomologique de Belgique 63:21–29.

Pictet, F. J. 1841. Histoire naturelle générale et particulière des insectes Névroptères. Famille des Perlides. 1. Partie: 1–423.

Stark, B. P. 1994. *Anacroneuria* from Trinidad and Tobago (Plecoptera: Perlidae).—Aquatic Insects 16:171–175.

Stark, B. P. 1995. New species and records of *Anacroneuria* (Klapálek) from Venezuela (Insecta, Plecoptera, Perlidae).—Spixiana 18:211–249.

Zwick, P. 1972. Die Plecopteren Pictets und Burmeisters, mit Angaben über weitere Arten (Insecta).—Revue Suisse de Zoologie 78:1123–1194.